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The Relation of Undergraduate to  
Post-Graduate Curricula.

WITH COMPLIMENT TO  
— OF —  
WILLIAM PEPPER

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AN ADDRESS

READ BEFORE THE

NATIONAL EDUCATIONAL ASSOCIATION,

AT

SARATOGA, JULY 12TH, 1892.

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BY WILLIAM PEPPER, M. D., LL. D.,

UNIVERSITY OF PENNSYLVANIA.

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Roland S. Falkner

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# RELATION OF UNDERGRADUATE TO POST-GRADUATE CURRICULA.



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AT SARATOGA, JULY 12TH, 1892,

By  
WILLIAM PEPPER, M. D., LL. D.,  
UNIVERSITY OF PENNSYLVANIA.



IN replying to the question of your President as to the subject of my remarks to you this evening, I fear that I selected the particular question of the "relations between undergraduate and post-graduate curricula," rather because it interests me so deeply at the present time than because I have anything new or important to submit to you upon the topic. But in reality, we seem to have reached a point in the development of our college and university work at which this problem forces itself upon us more urgently than ever before. As is the case with many others of our great educational questions, the data for the solution of this one are probably not yet adequately at hand. It is altogether likely that various solutions may be found, or, at least, that for some years to come interesting experiments will be conducted along various lines. The mere fact that widespread attention is being given from an university standpoint to the courses of study in our professional schools marks a distinct and important advance in our educational position.

I presume that the immense changes which have been made in the curriculum of our American colleges during the past twenty years have been almost wholly without reference to post-graduate or professional courses properly so called.

These changes have for the most part consisted in the marked increase in the requirements demanded for admission to college, in the introduction of considerable numbers of new branches to the lists of subjects taught in the four undergraduate years, and in the adoption of more thorough and exacting methods of instruction in each branch. There has been, as a necessary consequence, a marked increase in the ratio of the teaching force to the number of students taught, and in the amount expended by the college for each degree earned in course. The average age at entrance to college has advanced two full years in the last quarter of a century. The opportunities for high attainment and the incentives thereto have been multiplied, and with this greater maturity on the part of the students there has come an elevation of the grade of scholarship, and an improvement in the tone and dignity of undergraduate college life.

The development of the free elective and of the group elective systems would have been inevitable as a result of the overcrowding of the roster. But other causes have contributed to produce the result. The gratifying advance in the status of the teaching profession has been closely connected with the reduction in the number of hours required per week from each instructor; and with the advance in professorial salaries attainable as the result of the greater wealth of colleges and of increasing competition for successful teachers. So long as the average college professor was overworked and underpaid to the extent that prevailed a score of years ago, his influence was necessarily restricted. It speaks eloquently for the force and devotion of our elder teachers that in spite of such grave disadvantages they raised so high the standard of their calling, and impressed so deeply upon their students and associates the lessons of their self-consecrated lives. But with the return of a measure of leisure, and with the enjoyment of more liberal facilities for study and investigation, the

college professor has become a vigorous and progressive student and a frequent and successful author. His relations to society, to his students, and to his special subject have undergone great changes. His methods of instruction have felt the inspiration of the freer and fresher intellectual life enjoyed by himself. His students get more out of him, and in turn he gets more out of them. In every live college in America to-day it is safe to assert that each hour in the roster stands for a greater reality and thoroughness of intellectual work on the part of teacher and student than has ever before been secured here. With such a state of affairs, new subjects clamoring for admission to the curriculum, each subject claiming more hours and more earnest application, more force of instructors and wealth of illustration, the introduction of some privilege of election between studies became inevitable.

At the same time no less inevitably there appeared the desire on the part of the more progressive teachers and of the more earnest students for an extension of study beyond the possible limits of the undergraduate course. We have thus seen within a few years the rapid development of post-graduate studies as a feature of our American college system, a feature whose importance was certainly not recognized at first, and whose relations with undergraduate work are still far from being clearly defined. In most institutions there was little or no endowment available for the support of such advanced work. It encroached upon the time of the ablest teachers, who alone could conduct it. The fees of the few students who sought it formed no adequate compensation. It is not strange that at first it met with no warm encouragement, and that the attempt was made to crowd the advanced work back into the already overcrowded undergraduate curriculum.

Up to this very recent stage the nearest approach to a fully developed university that was made by even the most highly organized among our colleges was in the co-existence of a vigorous undergraduate department with one or more professional schools which owed their privileges to the same charter and were nominally under the control of the same

board of trustees, but which in reality had no more to do with the college than if they had been wholly independent institutions. The trouble was aggravated by the fact that such professional schools were nearly, if not quite always, managed in the interest of the faculty. In many cases it was known that the profits were out of all proportion to the duties performed by the professors, and it was more than suspected that the standard of education was deliberately kept down to favor a larger attendance of students. It is not strange that popular enthusiasm and benevolence did not go out towards that aspect of university work. Nor is it strange that when the college department of such an institution enriched its curriculum, elevated its standard at entrance and all along the line, and later projected a post-graduate department under a so-called faculty of philosophy, but little concern should have been felt for the effect such changes might have upon its relations with its own semi-detached medical or law school.

Yet, as a matter of fact, during these same eventful twenty years the tender consciences of medical and law faculties were beginning to prick uneasily at the flagrant disparity between their standards and those of other countries. A few of the stronger schools bravely incurred the risk of prolonging the course of study, exacting examinations at entrance and at the close of each term, and increasing the number of subjects taught. The wild race for cheap and easy diplomas went on and these schools suffered seriously for several years. Their classes were greatly reduced; their faculties did double labor for half pay. But, with few exceptions, they did not falter, and the tide soon turned.

The graduates under the improved educational methods immediately demonstrated their superiority, and carried off all the prizes available. Now as ever, one may safely assume that the American public will choose, and will cheerfully pay for the best product, so soon as convinced of its superior excellence. In a few years the success of the higher grade schools of medicine and of law became greater than it had ever been with lower standards. A strong revulsion of



feeling occurred in favor of thorough, honest, and adequate professional training, and it was not long before those who had doubted the possibility of exacting three years of six months' study began to plan for four years of eight or nine months each. Let us consider briefly what this implies in the case of medical study. I speak of this more fully, because it happens at present to be of the more immediate and urgent importance. Twenty-five years ago an American medical education meant the attendance upon two sessions of five or six months' duration, the instruction consisting of seven courses of didactic lectures, which were repeated annually, and a limited number of medical and surgical clinics. The faculty comprised from four to seven professors, all engaged in the practice of their profession, and expecting to receive the larger share of their remuneration from the widespread advertisement of their prominent position and from their cordial relations with their graduates, who, indeed, may well have reciprocated the indulgent favors shown them at their final examinations. The only equipment necessary was a building, with one room big enough to hold the swelling classes; if possible, it should be conveniently accessible to a hospital. Laboratories there were none, excepting the dissecting-room. The apparatus was most meagre; and a library would have been regarded as a needless luxury.

It will give some idea of the strenuous efforts that have been made to equip this one branch of professional education when I state that when the University of Pennsylvania inaugurates an obligatory four-year course of medical study in 1893 there will have been expended for the requisite buildings (including the Medical Hall, the Hospital, the Chemical Laboratory, the Laboratory of Hygiene, the Wistar Institute of Anatomy, and the Laboratory of Biology) over \$850,000, without counting the value of ground and equipment, which could not be estimated at less than \$250,000; that the annual cost of maintenance, without including a single professorial salary, will amount to \$115,000, and that the staff of instructors will number between eighty-five and ninety. It is evident that this means a serious stroke of work, and that the schools

which will stand together on this advanced plane count confidently upon the support of the most intelligent and highly-educated portion of the community. It is evident they must begin to compete vigorously for endowment, and that they will apply to the generous public for funds to endow professorships and fellowships, and to maintain costly laboratories (for we should spend several times as much in running a laboratory as will go to the teachers connected with it), with no less weighty reason than now support the appeals for our colleges. Within a year there will be half a dozen great schools offering facilities in medical education, almost, if not quite, equal to those obtainable abroad. This four-year obligatory course will be carefully graded; the first two years will be devoted to the fundamental branches, the latter two years, and especially the last year, should be so largely clinical in its character that it will be equivalent to a term as interne in a hospital. The principle of election will be introduced in the last year; a certain number of hours will be laid down, and then a certain number of additional hours must be made by choosing out of a list of special subjects offered as electives. Inducements of the most weighty nature will be offered to lead students who have the means, and particularly those who would fit themselves as teachers or investigators, to remain over a fifth year, and to devote this added time to work in the fully-equipped laboratories, the hospital wards, and the extensive libraries.

As may be gathered from the above statement, it has been found possible everywhere to interest the generous public in the endowment of professional schools just so soon as it is made clear that the school is conducted in behalf of science and the community and not of the members of its faculty. It must not be supposed that I would imply that medical professors were sinners beyond all the rest that dwelt in college land in these days. Human nature is wonderfully uniform. They did but what we all should do under similar conditions. There was absolutely no restraining authority on the part of the State or of Boards of Trustees. There was an immense continent being opened up and sparsely settled; the

demand for medical men was unprecedented; neither time nor facilities could be had for turning out the needed thousands with thorough training; half-baked loaves were gladly taken by those who otherwise must have fed on patent pills. The case was just as bad with the supply of teachers. What proportion of that great army had even the rudiments of the science of education? It remains true that until each State of the Union shall enact some wholesome legislation to protect the lives of its citizens from the malpractice of incompetent doctors, and the minds of its children from the malpractice of incompetent teachers, there will be abundant supplies of these commodities. It is easy to argue that we may not hope to supply every \$500 place with a man with a \$5000 equipment. But in fact it is precisely in those small and inaccessible places, where the incumbent is thrown upon his own resources, and where the counsel of colleagues and the opportunities for self-improvement are hard to obtain, that we need the services of men who have had thorough and practical education. It cannot be expected that as students they will all have been able to pay their own way through a long and costly course in college and in professional school. The time has come when the public and the State must hear and heed the demand for the endowment of the higher education, and especially for the establishment of great numbers of fellowships in schools of medicine, schools of pedagogy, schools of law, so that earnest students may complete their preparation for their life work.

In the last report of the Bureau of Education (Washington, 1891) the statistics for the year 1888-89 show that in three hundred and fifty-four colleges and universities, with 86,996 students, there were but 111 fellowships endowed, 581 scholarships established by the State, and 4588 scholarships established by private funds. In thirty-two schools of science endowed by the National Land Grant, with 9621 students, there were 9 fellowships; 2976 scholarships established by the State, and 207 scholarships established by private funds. In the remaining thirty-two schools of science not endowed by the National Land Grant, with 7716 students, there were 20

fellowships, 50 State scholarships, and 93 scholarships endowed from private sources. In these three great classes of institutions for higher education, with grounds and buildings then estimated at \$64,898,319, and productive funds reported at \$76,487,973, and total annual income from investments, from State or municipal aid, or from tuition fees, of \$10,170,485, and with benefactions for that year of \$4,839,851, the number of endowed fellowships available for post-graduate students would seem to have been only 140, although the total number of resident graduates is reported as 1358.

On turning to professional schools, we find in one hundred and forty-one schools of theology, with 6989 students, that the number who had received a degree in letters or in science was 1453 (20.8 %), and the number of endowed scholarships was 584. The total income was \$959,654, and the benefactions for that year had been \$630,402.

In fifty-two schools of law, with 3906 students, the number who had received a degree in letters or science was 829 (21.2 %), and the number of endowed scholarships was 26. The total income was only \$55,589, of which \$46,164 was from fees of students, and no benefactions were reported. It is needless to comment upon the low state of equipment and endowment revealed by these figures.

In one hundred and fifteen schools of medicine, including ninety-two regular, nine eclectic, and fourteen homœopathic, with 14,066 students, the number who had received a degree in letters or science was 1378 (or 9.8 %), and the number of scholarships was 219. The value of buildings and grounds is reported at \$3,356,618; the amount of productive funds, \$248,000; the total income, \$486,990, of which \$390,361 was from fees of students; the benefactions for the year had been \$104,343. During the years 1888 and 1889 there were 12,898 degrees in course conferred, of which only 121 were Ph. D.

In one hundred and twenty-nine public normal schools, with 20,622 students of the science and art of teaching, and in forty-two private normal schools, with 4487 students, it does not appear that there were any endowed scholarships or fellowships.

I come now to what seems a point of extreme importance. It will be readily inferred from the above figures that, in spite of the magnificent promise of the last few years—a promise which surely will be more than kept—there is no practically conceivable amount of benefactions which will enable the bulk of these students to accomplish the desirable purpose of securing a baccalaureate degree before entering on their professional studies so long as the completion of their college course occupies them until the close of their twenty-second year. John Fiske, in his *Outlines of Cosmic Philosophy*, has some fine passages on the influence of the lengthening of the time of caring for children, upon the development of the family, and of the lengthening of the period of youthful mental plasticity upon the ability of a new generation to improve upon the ideas and customs of its predecessors. But this process must be a very slow one; and the honest merchant or farmer who would fain give his ambitious child the best equipment for his profession will draw from it small comfort in his efforts to support that child up to the age of twenty-five or twenty-six years. Although I have spoken of the medical profession chiefly, it must be remembered that the preparation needed for the highest success, or even for good work, in very many callings is now so extensive and minute as to constitute a veritable professional education. This is so, of course, in the case of theology and of law. Is it not practically the same as regards pedagogy, journalism, chemistry, engineering, architecture, literature? It is assuredly the case that to-day all who aspire to be well equipped for any of these avocations desire, and, were it attainable, would insist upon a post-graduate course in the branches specially related to the profession of their choice. Of course, great numbers of the seven thousand graduates\* who received their degrees in letters or science last month will enter at once upon work in some of the

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\* There were sixty-four hundred and seventy-five degrees in letters, science, and philosophy conferred by American colleges in 1888-89.

professions which are not yet protected by the requirement of a special additional course of instruction. Many others will be forced to satisfy themselves in their choice of a professional school with those whose diplomas can be most readily won in the shortest time. Many of us can attest this from our personal experience, but the fact is confirmed by the small percentage of the students of medicine, law, and theology who, as already shown, have received previous degrees in letters or in science.

No one questions the importance of previous academic training to every student of these professions. The higher the standard of the professional school is raised the more evident does the need of a higher entrance examination become. We would gladly insist upon the degree of B. A. or B. S. as a pre-requisite for admission. But in practice the significant fact has been observed, and especially in medical schools, where the recent advances in standard have been more marked than in other professional schools, that as the course has been lengthened and the curriculum rendered more rich and difficult, the proportion of students holding degrees in letters or in science has tended to decline. It cannot be doubted that if the four-year obligatory course of medical study which will speedily be enforced at the leading schools of the country were to be associated with the requirement of a baccalaureate degree for admission, there would not be a single institution that could stand the strain with their existing inadequate endowment. Whatever entrance examination may be enacted will presumably be dealt with in most cases as a matter for cramming, rather than be met, as it should be, by the presentation of a suitable degree or certificate won in a properly adjusted course of undergraduate study. Very much the same thing exists in regard to the law schools, where, however, the case is further complicated by the fact that the routine of the lawyer's office and the Bar examination offers in most States an additional avenue of entrance into the legal profession. The truth is, as indicated above, that all the changes and advances and prolongations of the undergraduate curriculum have been without reference

to the effect upon these great branches of post-graduate study.

But the difficulty which has been for some years conspicuous as regards these branches is coming to be felt keenly as regards others, such as pedagogy, architecture, engineering, the science of administration and finance, and the like. The recognition of an actual need called into existence schools of science, and their unprecedented success has forced the colleges to reconsider their curriculum. As the requirements for the profession of chemist, of architect, of engineer have been successively advanced, it has become clear that a typical education for any student intending to pursue one of these professions would be, just as in the case of medicine or of law or of theology, a good college course followed by two or three years in a post-graduate professional school. It is not necessary to consider the question here as to the propriety of a single baccalaureate degree B. A., or of several, such as B. S. and Ph. B. in addition. The decision has come to hinge almost upon the single item of Greek. Most people now believe that the disciplinary value of courses in science, with a fair proportion of letters, is equivalent to that of courses in letters with a fair proportion of science. Nor can it be doubted, I think, that each of the branches above mentioned demand expansion into a highly-equipped post-graduate professional school. Nay, more; I think it will soon be conceded that each of these schools—medicine, law, theology, pedagogy, architecture, art, social and political science, literature—embrace more than one subject which should be recognized in the strictly university course leading to the doctorate of philosophy.\*

When scientific courses were first opened in colleges, in competition with the pre-existing literary courses, the grade was so much lower that they attracted not only the students who intended a serious preparation for their profession, but many others who chose them only on account of their

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\* For instance, at Johns Hopkins pathology, and at the University of Pennsylvania hygiene, have been so recognized.

easiness. As the standard of scientific education has been steadily advanced literary studies are being more and more crowded out from these scientific courses, and we are witnessing the development of professional schools of technology as integral parts of the undergraduate departments of our universities. Within a few days I have listened to the earnest appeal of Professor Shaler, Dean of the Lawrence Scientific School at Harvard, for a larger recognition and development of these professional scientific courses in the college department of that university. At the University of Pennsylvania we tried for fifteen years to conduct the courses in the Towne Scientific School from a university—or rather from a non-technological standpoint—but it has been found impossible to evade the difficulties and defects of that position, and now they are fully equipped and conducted as true technological courses. Each technical course covers four years and leads to the degree of B. S. in architecture, chemistry, civil engineering, mechanical engineering, and electrical engineering respectively. Graduates of these courses who have shown marked progress in their profession and have submitted a satisfactory thesis may receive the degree of Master of Science, together with the professional degree appropriate to the course pursued. At the same time a scientific course covering five years is conducted, the first two years devoted to general literary and scientific study, the last three years chiefly to technical work in the various professional branches. At the end of the senior year the general degree of B. S. is given, and at the end of the post-senior year the degree of Master of Science. The professional degrees may be conferred upon Masters of Science of two years' standing who have made satisfactory progress in their professions and have presented an acceptable thesis.

The effort to provide for the wants of earnest and valuable students, who cannot postpone entirely the preparation for their profession until after the completion of their undergraduate course, is leading in the same way to the intrusion into the B. A. and B. S. courses of subjects of the



most diverse character which are clearly portions of post-graduate true University work. At the same time, the growing demands of each branch of professional study for more thorough, advanced and prolonged work will lead to the establishment of numerous and varied post-graduate schools whose curricula cannot be adjusted economically to that of the B. A. or B. S. course, since its demands are so great as to make it increasingly difficult for the student to take a full college course prior to entrance upon his professional studies. It seems inevitable that this process should go on, and go on rapidly, if the age of admission to college continues as high as at present, and if the requirements for the B. A. degree are made as of late, more and more exacting. Of course there are colleges and colleges—several hundreds of them, and of all degrees of strength and soundness. It is quite possible that one or more may maintain such a standard and continue to draw adequate numbers of students. There is much to be said, however, in favor of uniformity of educational requirements. There is wide scope for superior excellence in the greater degrees of thoroughness with which they are exacted. And looking at the subject from the standpoint of the interests of the whole country, I have not been able to resist the conclusion, the reasons for which are here merely glanced at in a desultory and defective fashion, that it would be better for the future of our university education if the age of admission to college were to be lowered decidedly, and if the B. A. degree was made to represent a definite stage of true college education attainable by good students of not more than nineteen or twenty years of age. I believe firmly, moreover, that with the establishment of proper relations between the college and the secondary school, a result which would be rendered infinitely easier by an approach to uniformity and simplicity in the entrance examinations and curricula of our colleges, it would be found possible to send students up to college at an age decidedly lower than at present, and with even better preparation than can now be secured as a rule. There would go with this, as an inseparable corollary, the development of a group of vigorous, highly-equipped

post-graduate schools, with curricula of two, three, or four years' duration according to the subjects involved. As an essential to admission would be exacted the B. A. or B. S. degree or an equivalent preparation; and in consequence there would be a harmonious and economical adjustment of instruction in the undergraduate and post-graduate courses. The post-graduate schools would confer the appropriate professional degrees or the degree of Ph. D. according to the faculty in which studies were pursued, and the co-ordination of this system of schools would constitute the university in the full sense of that term.

It is obvious that we in America are developing a great national system of college and university education. It may be too early to predict what its leading features will be. The entire absence of governmental control makes it all the more important that frequent and full discussion shall be held upon all the important questions involved. One thing that may be assumed is that it will not be a mere imitation of the system of any other country, whether France, England, or Germany. At the same time it would seem likely that the general plan which in Germany has led to such brilliant results may present more features adapted to our conditions than are to be found in the educational systems of other countries. All are familiar with the organization of the gymnasium and the realschule, and without assuming that the courses of instruction therein provided, either under the former regulations or as recently modified, would be most desirable as a college curriculum for us, it is important to observe how completely the difficulties to which I have already alluded are there avoided. In general the boy enters the gymnasium or the realschule at the age of nine years, and the course in each is arranged to occupy nine years. By the more liberal conditions established by the recent official decrees, there is a distinct approach to a common type, as shown by the fewer hours devoted to classical studies (especially Greek) in the gymnasium, and by the corresponding increase in the amount of time devoted to the natural sciences and the mother tongue. The right to confer

the certificate of maturity (admitting to the university) now pertains not only to the gymnasium, but to both of the two schools into which the former realschule is now divided—the real-gymnasium and the ober-realschule. The gymnasial certificate, however, still carries the higher distinction, and is the only one which admits to all faculties of the university. We see here a proof that the German system is plastic, and that it can adapt itself to the established claims of new educational opinions. The fact that the certificate of the gymnasium, or the real-gymnasium, or even the ober-realschule (though in the case of this latter only to certain courses), admits to the university without further examination, shows how thorough is the adjustment of the different stages of education, and how effectively and economically the time available can be disposed of. It results, then, that the student can enter the university at from eighteen to twenty years, either by special examination or on certificate, and that he at once begins the special line of study adapted to his future career. Throughout the gymnasial course the fundamental principle is the giving of a liberal training, and there is declared opposition against the introduction of professional studies of any kind, and even against the giving of a professional turn to instruction in any subject. The importance of this principle as helping to secure the broadening and strengthening effect of education upon the mind at this stage of its development cannot be overestimated. Yet, with all this, the degree of Ph. D. can be attained in three years' study in the university, or by the age of twenty-one to twenty-three. The courses in theology and law are of the same length; while even that in medicine, which is the longest, and occupies four or five years, can be completed, with the State's examination for license to practice and with or without the doctor's degree, by the age of twenty-three to twenty-five years.

The entire educational system of the country, and this includes Austria as well as Germany, is thus directed to secure thorough liberal training in letters or science, followed by thorough professional study, and yet is so arranged as to permit the student to enter all branches of professional life or the

higher employments of the State at a reasonably early age. Practically the same result is secured in France, where, for instance, the candidate for the degree of Doctor of Medicine must possess the degree of *Bachelier ès lettres*, corresponding about to the certificate of maturity (*Abiturienten-Zeugniss* of the German *Gymnasias*), and in addition must possess the *Baccalauréat ès Sciences* as regards mathematics and natural sciences. In spite of this very thorough preparatory education, and of the fact that the required course of medical study is four years, of ten months each, the license to practice can usually be secured by the age of twenty-four years. In France also, therefore, the system is coherent and secures effective results with economy of time and labor.

In England, on the other hand, a struggle, similar in some respects to our own, seems pending over this very question of the relation of the medical to the undergraduate curriculum. The demand for more thorough instruction in natural science and the clinical branches has led to a conviction that the medical curriculum must be prolonged to five years; and the General Medical Council of Great Britain has accordingly passed resolutions that all students of medicine who matriculate after January 1st, 1892, shall pursue a five-year graded course of study. Before entering upon this course there must be passed a preliminary examination in English, in Latin, in mathematics (including arithmetic, algebra, and the first three books of Euclid), in the elements of dynamics, and in two optional subjects chosen from the following: Greek, French, German, higher mathematics, natural philosophy, logic, and moral philosophy.

The new medical curriculum ordains only a limited amount of instruction in botany, natural history, physics, and chemistry, and it is evident that the above preliminary examination is scarcely equal to that required for admission to the freshman class of our stronger American colleges. At the same time, in a report presented to the Board of the Faculty of Medicine of Oxford University, and communicated to my friend, Dr. Ord, of London, by Sir Henry Acland, the principle is reaffirmed that no candidate should be admitted to the first examination

for the M. B. degree of Oxford until he has passed all the examinations required for the degree of B. A. It seems to me apparent that, just as with us, the whole bearing and influence of this new legislation will be to still further divorce professional from college education, and to still further reduce the proportion of those who bring up to the professional studies a degree or certificate attesting thorough previous education.

The question of time seems to me to enter so largely into the problem that even though we advance the requirements for admission to our schools of medicine, of law, of theology, of pedagogy, of political science, as we should, and as we must, we shall not secure the great desideratum of more general attendance at college, so long as the requirements for admission to college and the college curriculum are such as to make the age at graduation from twenty-two to twenty-four years.

We shall rather, I fear, tend to make a larger and larger proportion of students depend upon the secondary school or upon special cramming to prepare directly for the entrance examination to the various professional schools; a result clearly, as it seems to me, to the disadvantage of the secondary school, the college, the professional school, and the student. There are, it would appear, but two alternatives—either a general restoration of the B. A. degree to its old signification and value, or else a continuance of the process of modifying the college curriculum, which has set in so vigorously, with the view of adapting it to the increasing requirements of the post-graduate curricula. I have already expressed my preference for the former of these courses; but this would be a slow process, and the requirements of the case are, in various directions, urgent. Pending more full study of the question, it will be interesting to note how the various expedients that are to be tried will work. For instance, at the University of Pennsylvania the adoption of the obligatory four-year course of medical study has induced the trustees and the college faculty of that institution to provide a special elective group in biology and natural science, covering junior and senior

years, which may be chosen by those who have entered either for B. A. or for B. S. A student who pursues successfully this elective course will be admitted to the second year of the medical school. Even better than this, there has been arranged a graded five-year course which may be elected at the close of sophomore year, so that thus also the baccalaureate degree and the medical degree may be earned in seven years. In this really admirably combined biological and medical course there are offered advantages not surpassed, if equaled, by the new five-year English curriculum or by that of either the German or the French universities. In effect, indeed, it is not unlike the provision in Germany, where the student, who has won the gymnasial certificate of maturity, and proposes to take the medical course in the university, passes at first into the philosophical faculty to study zoology, mineralogy, botany, physics and chemistry, anatomy and physiology; and at the close of the second year, passes the *tentamen physicum*, after which the final two years are devoted wholly to technical medical branches.

The advantages of the methods adopted by the University of Pennsylvania are obvious, and they are very considerable. They are open, however, to the serious objection that they still further complicate the undergraduate curriculum and still further introduce into it the professional element. They are open to a further practical objection. Such an arrangement may be excellent where there are exceptionally strong advantages for the biological and natural science studies; but it is difficult to see how it can meet the wishes or promote the interests of other colleges. It may induce a limited number of students to leave their colleges at the end of sophomore year so as to take advantage of one or the other of the elective courses above described, but this were a result which would seem undesirable.

I do, indeed, venture to hope that this action of the University of Pennsylvania, particularly if, as I trust to see, similar action shall be taken also by other leading universities with strong medical schools, will have the effect of inducing colleges to introduce such full biological courses in the

last two years of their curriculum as will lead many students to take their baccalaureate degree, since it would secure admission to advanced standing in their professional course and save one full year in the acquisition of the doctorate. But I fear that for the most part the immediate effect of the advanced standard of medical education now established by a number of the leading schools will be to deter students from going to college, and to induce them to prepare specially for the examination which will admit directly to the professional school.

I know that the entrance examination, even to our best medical schools, is shamefully low. Personally I advocate getting the prolonged medical course, with its ample practical and laboratory instruction, strongly established before loading the experiment down at the other end. The absence of endowment and the destructive competition among the absurdly numerous medical schools make me apprehensive. But either at once or in a couple of years the entrance examination must be decidedly advanced. The most advanced requirement demanded to-day is, I presume, that called for by Harvard College, which includes only the following subjects:—

1. *English*.—Every candidate will be required to write, legibly and correctly, an original English composition of not less than two hundred words, and also to write English prose from dictation.

2. *Latin*.—The translation of easy Latin prose.

3. *Physics*.—A competent knowledge of physics (such as may be obtained from Gage's Elements of Physics).

4. *Elective Subject*.—Each candidate must pass an examination in any one of the following subjects: French, German, the elements of algebra or of plane geometry, botany.

By the recent action of the Regents of the University of the State of New York, it is directed "that hereafter they will require their academic diploma (which Mr. Secretary Dewey defines 'as meaning a good, thorough high-school course') or its equivalent as a minimum of general preliminary

education from any candidate for any degree conferred on examination by the university."

But even when all the leading colleges shall have come up to, or shall, as I trust to see before five years are over, have passed the standard thus set, I am convinced we shall not have lessened in the least the difficulties of those students who would gladly take both college and university courses, but are hindered by the exalted requirements for the B. A. degree.

The expedient recently adopted at Columbia College seems to me neither more hopeful nor less objectionable. As President Low writes: "At the end of the junior year our seniors take all their studies under one or the other of the university faculties, including those that give a professional education as well as those that do not. By this system a student must still give four years of study for our B. A. degree, but for such students as combine with the college course a professional training, the total time is shortened by one year."

The ultimate effect of this arrangement upon both undergraduate and post-graduate curricula in Columbia cannot be foretold; doubtless there are the strongest reasons for expecting it to be excellent, or the plan would not have been adopted by the distinguished president and faculties of that institution. I can readily imagine also that as regards a single university, the curriculum of the first three years might be so arranged as to enable such a plan as the above to work well. But if, as would be inferred from statements published, though not official, it were proposed to admit students from other colleges at the close of their junior year to full standing in the senior class at Columbia, with the privilege of securing the B. A. degree in one year, and, for instance, M. D. in three years more, the arrangement would seem open to grave criticism from the standpoint both of Columbia and of the general college system of the country. It were indecorous to discuss more fully arrangements which have not been promulgated officially in full detail; and equally indecorous to more than allude to the proposition advanced

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at Harvard by our distinguished colleague, President Eliot, since it has not yet been embodied in legislation by that university.

I feel that no apology is needed for the introduction of this subject. Even with the imperfect statement I have made it challenges your serious attention. There are said to have been almost twenty thousand students in medical schools during the last college year; less than nine per cent. had baccalaureate degrees. The claims of this great army of students deserve consideration. Precisely the same problems are arising with regard to our law students, and our students of theology, of pedagogy, of architecture, of engineering, and of other professions.

So many experiments have been tried with the undergraduate curriculum that we hear from every side demands of the most extraordinary boldness.

If the process which, most unfortunately as it seems to me, has been pursued with constantly accelerating speed for twenty years be continued much longer, it is to be feared that the undergraduate college curriculum will be hopelessly distorted and perverted, and will become a medley of college and university instruction, divorced from the true university schools, and yet wholly inadequate for any class of the community except for those estimable gentlemen of independent means, who find it unnecessary to fit themselves for any serious pursuit in life by thorough education in any single branch.

It seems doubtful if any of the expedients suggested to avoid the urgent problems forced upon us in consequence of the present state of the undergraduate curriculum are of more than local and temporary value. It remains to be seen whether a wiser course towards a solution of more permanent and general efficiency may not be found in concerted efforts on the part of university, college, and secondary school in favor of a restoration of the baccalaureate degree to a position of greater stability and more in accordance with its original historic signification. The great anniversary year, 1893, will find us with the victory over the huge material forces of this

continent practically won; it will find us with our political federation strongly, and, as we devotedly trust, indissolubly cemented; but we must recognize that our greatest battles are still to be fought: between sound doctrine and specious error; between the wise and humane equities of a true democracy, and the blind ignorance or the blatant folly which would array labor against capital and masses against classes; between the forces that make for and those that make against truth and order and progress. The issues are portentous. Naught but education, thorough, free, universal, can win for us.

No less than we needed political federation do we need the federation of our educational forces from the primary school to the university—their federation and their loyal, effective co-operation.



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